

SOP Title: Use and Maintenance of the Thermo Fisher Sorvall Legend XTR Centrifuge in the HPV Serology Laboratory

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1. PURPOSE

- 1.1. The purpose of this procedure is to describe the use and maintenance of the Thermo Fisher Sorvall Legend XTR centrifuge.

2. SCOPE

- 2.1. This procedure applies to the Human Papillomavirus (HPV) Serology Laboratory located at the Advanced Technology Research Facility (ATRF), room C2007.

3. REFERENCES

- 3.1. Thermo Fisher Scientific Sorvall Legend XTR Instruction Manual, 50119927-4
3.2. HSL_EQ_019: Use and Maintenance of the Milli-Q Integral 3 Water System
3.3. HSL_GL_001: Waste Disposal at the Advanced Technology Research Facility

4. RESPONSIBILITIES

- 4.1. The Research Associate, hereafter referred as analyst, is responsible for reviewing and following this procedure.
4.2. The Scientific Manager or designee is responsible for training personnel in this procedure and reviewing associated documentation.
4.3. The Quality Assurance Specialist is responsible for quality oversight and approval of this procedure.

5. DEFINITIONS

Term	Definition
FME	Facilities, Maintenance and Engineering
RCF	Relative Centrifugal Force
RPM	Revolutions per minute
SDS	Safety Data Sheets

6. REAGENTS, MATERIALS AND EQUIPMENT

- 6.1. Reagents
- 6.1.1. Cavicide (Warehouse, Cat # 79300360)
6.1.2. Ster-ahol (VWR, Cat # 14003-358 or equivalent)
6.1.3. Bleach, concentrated (Warehouse, Cat # 68100251)

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6.1.4. Bold Grease (Thermo Fisher, Cat # 75003786)

6.2. Equipment

6.2.1. Centrifuge

6.2.2. Beam Balance (Harvard Trip Beam Balance or equivalent)

6.2.3. Rotors

6.3. Consumables

6.3.1. Wypalls Paper Towel (Warehouse, Cat # 79300335 or equivalent)

7. HEALTH AND SAFETY CONSIDERATIONS

7.1. Proper safety precautions should be taken while working in a laboratory setting. This includes, but is not limited to, proper protective equipment such as lab coats, safety glasses, closed-toe shoes, and non-latex gloves.

7.2. Refer to the respective SDS when working with any chemicals.

7.3. Refer to "HSL_GL_001: Waste Disposal at the Advanced Technology Research Facility" regarding waste disposal processes at the ATRF.

8. GENERAL INFORMATION

8.1. Do not use the centrifuge in the vicinity of flammable liquids or vapors; do not run such materials in the instrument.

8.2. Do not lean on the instrument or place items on it while it is operating. Do not move the centrifuge while it is running.

8.3. Make sure the rotor is balanced and properly loaded before starting the run. Never overload the rotor.

8.4. Do not use rotors that show signs of corrosion and/or cracks. Always use the rotor with the rotor lid.

8.5. Never start the centrifuge with the lid open. Do not open the lid until the rotor has come to a complete stop.

8.6. Do not use the centrifuge if parts of its cover panels are damaged or missing.

8.7. Do not touch the electronic or mechanical components of the centrifuge. Do not alter the electronic or mechanical components of the centrifuge.

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- 8.8. If a spill occurs, immediately decontaminate surfaces of the centrifuge with Cavicide; allow a 3-minute contact time.
- 8.9. Perform all centrifugation as RCF, to eliminate variations between centrifuges, based on length of the rotor arm versus RPM.
- 8.10. Centrifuge must be located on a supporting structure that is stable and free of resonance, with a minimum safety zone of 30 cm around it on all sides.
- 8.11. In case of electronic failure during a centrifugation procedure, material may be retrieved by pulling the two emergency release cables at the same time in the rear of the instrument. See Attachment 1 for diagram.

9. USE OF CENTRIFUGE

- 9.1. To turn power on, flip the switch on the back of the instrument. The device will perform a self-check of the software once power is turned on.
- 9.2. The control panel contains all the keys and displays needed to operate the centrifuge. See Attachment 2 for diagram.
- 9.3. Press the "Open" Key to open the lid of the centrifuge.
- 9.4. Select the rotors appropriate to the experiment being performed and place rotor over the centrifuge spindle. The rotor should automatically lock into place and can be confirmed by lifting slightly on the handle. If the rotor can be pulled up it is not properly secured and must be reclamped to the spindle.
- 9.5. If a specific temperature is required for the run, set the temperature then hit the "Enter" key. Confirm instrument is at proper temperature before use.
 - 9.5.1. The display pad will show two temperatures; the top value is the current temperature of the centrifuge, and the bottom temperature is the set temperature.
 - 9.5.2. When both values are the same, the centrifuge is at the correct temperature.
- 9.6. Place samples into the centrifuge and use a beam balance to balance the tube/bucket when applicable. Otherwise, balance the tubes by inserting the tubes opposite each other in pairs into the bucket holders. To ensure symmetric loading, tubes that are arranged opposite each other must be of the same type and contain the same filling quantity.
- 9.7. Next, lock the rotor lid or bucket lids into place.
- 9.8. Close the lid of the centrifuge.

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- 9.9. Enter desired settings on the control pad, to account for acceleration curve, braking curve, speed and time. Preset programs can be used when applicable; see Section 10.1. Press the “Enter” button to confirm settings.
- 9.10. Press the “Start” key to begin the centrifuging process.
- 9.11. If the load is improperly balanced, the instrument will display the message “Imbalanced Load” and the run will terminate. Rebalance the load and re-start the run.
- 9.12. To stop run manually, press “Stop” key.
- 9.13. At end of configured run, the message “END” will appear in the display. Open the centrifuge by pressing the “Open” key and remove samples.

10. CONFIGURING, STORING AND PROTECTING A PROGRAM

- 10.1. Programs can be stored and retrieved later by means of assigned number. It is the analyst’s responsibility to confirm the program being used matches requirements set forth in the associated procedure.
- 10.2. See Attachment 3 for configuration assistance.

11. MAINTENANCE

- 11.1. Monthly Maintenance
 - 11.1.1. Clean instrument surfaces and rotors, by pre-wetting paper towel with cavicide and wiping clean.
 - 11.1.2. Clean buckets, inserts, and bioshields by submerging these items into a pan of 10% bleach. Allow the items to soak for 30 minutes, then rinse the items thoroughly with water. Allow the items to dry prior to use.
 - 11.1.3. Record maintenance on “HSL_EQ_003.01: Sorvall XTR Centrifuge Maintenance Form.”
- 11.2. Add grease to rotor-bucket junction on an annual basis. Record maintenance on HSL_EQ_003.01.
- 11.3. Centrifuge is calibrated annually by FME or vendor.

12. TROUBLESHOOTING

- 12.1. Section 7-3 of the instrument manual covers Failure Messages by the instrument, and possible causes and cures.

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12.2. Section A-1 of the instrument manual contains a Chemical Compatibility Chart. Reference this as needed.

12.3. Contact customer service when needed. Order number and Serial number of the instrument will be required when making this call. The information is found on the back of the instrument near the inlet for the power supply cable.

13. ATTACHMENTS

13.1. Attachment 1: Mechanical Emergency Door Release

13.2. Attachment 2: Control Panel and Keys Diagram

13.3. Attachment 3: Setting Up a Program

13.4. Attachment 4: HSL_EQ_003.01: Sorvall Legend XTR Centrifuge Maintenance Form

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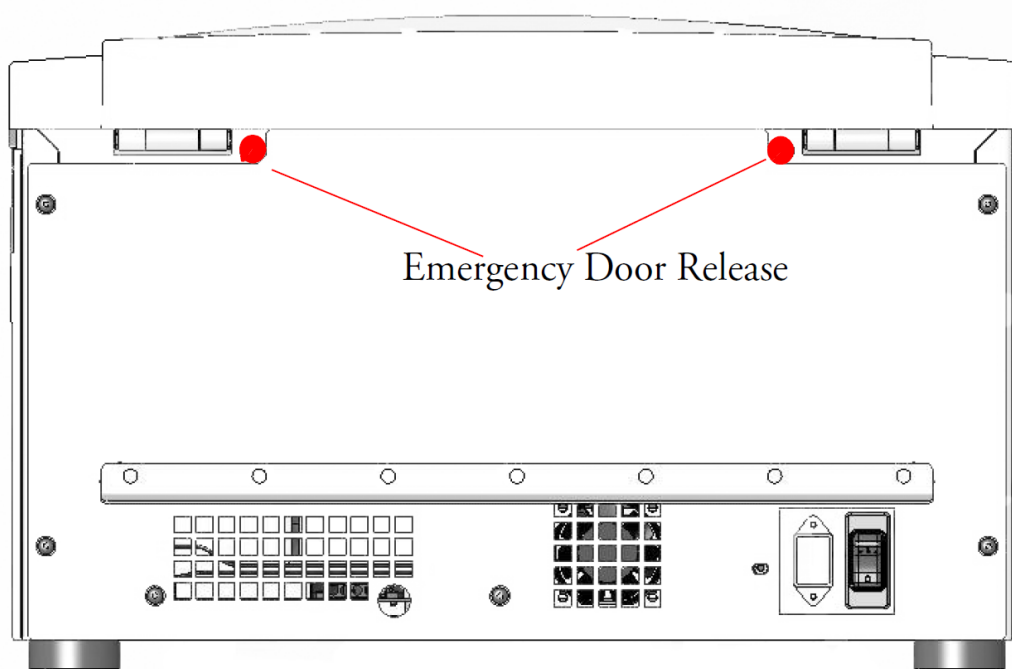
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Attachment 1: Mechanical Emergency Door Release

1. Make sure the rotor has stopped (view port in the lid).
2. Pull out the power supply plug.
3. On the back of the housing are two black plastic plugs which can be pried out of the back plate with a screwdriver or knife. Pull the release cord attached to it at the same time to trigger the mechanical lid release. The lid will open and the samples can be removed.
4. Put the cord back into the centrifuge and mount the plug.
5. Reconnect the centrifuge once the power has been restored. Switch on the centrifuge and press the Open key to have door locks operative again.



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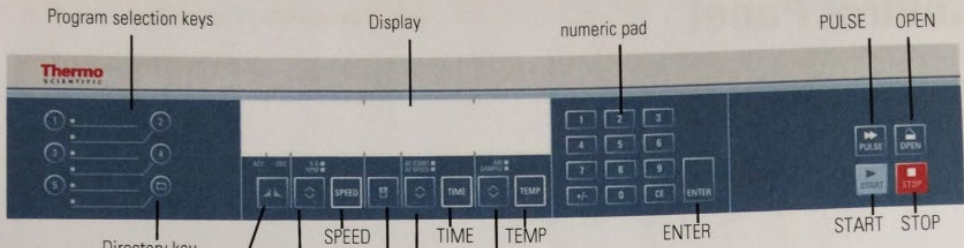
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








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Attachment 2: Control Panel and Keys Diagram



The diagram shows the control panel of the Thermo Fisher Sorvall Legend XTR Centrifuge. Labels point to various components: Program selection keys (1-5), Display, numeric pad (0-9, +/-, CE, ENTER), PULSE, OPEN, Braking and Acceleration Key (ACC/DEC), SPEED, TIME, TEMP, ENTER, START, and STOP. Below the diagram, a table explains the functions of the keys.

The keys allow user intervention for controlling the operating mode as follows:

Key	Display contents
 Start	Normal start of the centrifuge
 Stop	End run manually
 Open lid	Automatic release (possible only when device is switched on). Emergency release (see "Mechanical Emergency Door Release" on page 7-2)
 Pulse	By pressing the key PULSE  the centrifuge starts immediately and accelerates up to the end speed. Releasing the key initiates a stopping process at the highest braking curves.
 Directory	Use the directory key  in order to modify the displayed value
 Bucket	Use the bucket key  in order to have all available bucket types displayed in succession.
 Braking and Acceleration Curves	Use the ACC DEC key  to toggle between braking and acceleration curves.
 Changing the display mode	Use the Toggle key  to change the display mode. (speed / RCF value, sample / chamber temperature, run time counter from start or preset speed on)

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Attachment 3: Setting Up a Program

1. In order to load memory programs 1-5, press any of the five numbers on the key pad on the left-hand side of the centrifuge.
2. Enter the program parameters. Enter braking, acceleration, RCF, running time, temperature, bucket code and bucket radius.
3. Hold down the number associated with the new program until it says "Program X Saved."
4. To save programs 6-99, hit the directory folder button on the key pad on the left-hand side of the centrifuge.
5. It will ask you to recall a program number. Type in the desired number of the program to be designed. Press "Enter".
6. Enter the program parameters. Enter braking, acceleration, RCF, running time, temperature, bucket code and bucket radius.
7. Hold down the directory button until it asks you to save the program.
8. Re-type in the number you want the program to be named. Press "Enter". Program has been saved.

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Attachment 4: HSL_EQ_003.01: Sorvall Legend XTR Centrifuge Maintenance Form

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Maintenance Year:				Equipment ID:	HSL_	
Month	January	February	March	April	May	June
Cavicide Lot Number:						
Cavicide Expiration Date:						
Bleach Lot Number:						
Bleach Expiration Date:						
Performed by/date:						
Reviewed by/date:						
Month	July	August	September	October	November	December
Cavicide Lot Number:						
Cavicide Expiration Date:						
Bleach Lot Number:						
Bleach Expiration Date:						
Performed by/date:						
Reviewed by/date:						

Annual Maintenance

Performed by/date:

Reviewed by/date:

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Unscheduled Maintenance

Date	QE Number	Activity Performed	Recorded by/date	Reviewed by/date

QA Reviewed by/date: _____

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